SB761
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FOREST PEST MANAGEMENT

United States
Department of
Agriculture

Forest Service

Forest Pest Management
Denver, Colorado

BIOLOGICAL EVALUATION
R2-85-7

WESTERN TENT CATERPILLAR
Blanco Basin, 'V' Rock,
Chama Basin Areas

San Juan and Rio Grande
National Forests

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INTRODUCTION

Each year since 1977, several thousand acres of aspen on the San Juan National Forest and adjacent private land have been defoliated by the western tent caterpillar, Malacosoma californicum (Packard).

An aerial survey of the defoliated area was made on July 17. During August, an egg mass survey was conducted to gather data for predicting 1986 defoliation levels. Since 1977, defoliation predictions were based on the average number of egg masses per two branch sample.

TECHNICAL INFORMATION

INSECT: Western Tent Caterpillar, Malacosoma californicum (Packard)

Hosts:

Quercus spp.	Ceanothus spp.
Salix spp.	Cercocarpus spp.
Prunus spp.	Ribes spp.
Rosa spp.	Populus spp.
Amelanchier spp.	Betula spp.
Purshia spp.	Alnus spp.

Life History: The western tent caterpillar completes one generation each year.

Stage	Time	Location on Host
Larvae within egg	Overwinter	In masses encircling twigs
Small larvae	June	In small tents and feeding on new leaves
Large larvae	June & July	In large tents and feeding on leaves
Pupae	July	In yellow cocoons on branches
Adult moths	July & August	In flight

Evidence of Infestation:

1. Silken tents in the branches of host trees

2. Defoliation of host trees

3. Hairy larvae with blue and black markings migrating up and down boles of defoliated host trees

4. Presence of silvery egg masses encircling twigs of host trees

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EVALUATION METHODS

Three trees were felled at each of ten sampling sites. These are the same sites that have been sampled for the last several years.

Each limb was searched for new egg masses to determine the total number of egg masses per tree. In addition, two 30-inch branches from the upper crown of each tree were examined separately and the quantity of egg masses on each branch was tallied.

RESULTS AND DISCUSSION

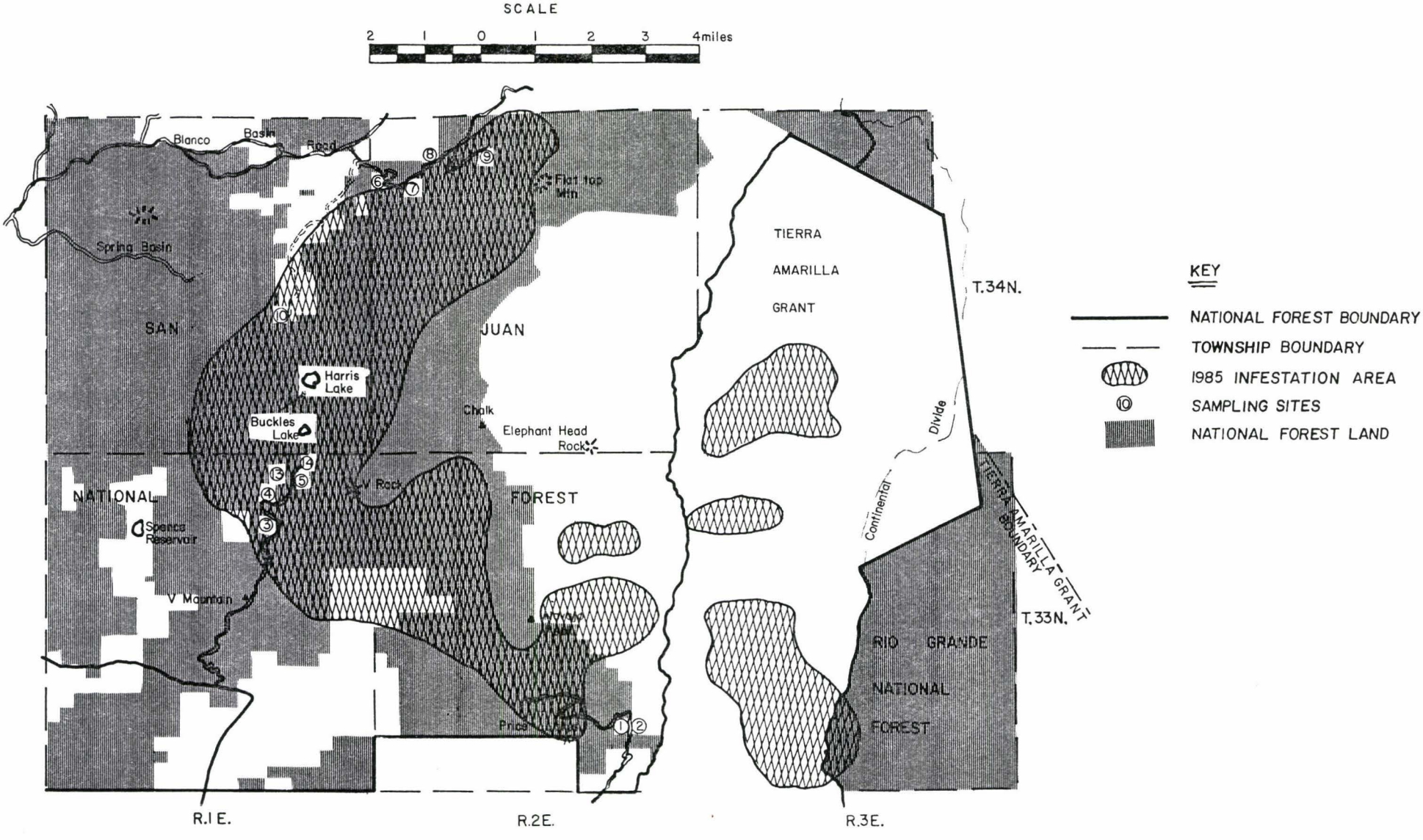
The area defoliated by the western tent caterpillar in 1985 is shown in Figure 1. The area defoliated in 1984 is shown in Figure 2 for comparison. For the first time since the start of the outbreak, the area of visible defoliation declined significantly from the previous year (Figure 3). In 1985, about 30,325 acres were defoliated while almost 94,000 acres were defoliated in 1984 (Table 1).

The 1984 and 1985 ground survey data from all of the sampling sites is presented in Table 2. A summary of egg mass sampling results for the year 1977 through 1985 is presented in Table 3. Egg mass densities from 1977-1984 were high enough to result in severe defoliation.

In 1985, the mean egg mass density was 1.03 egg masses per two-branch sample. This density is outside the range of egg mass densities that have resulted in severe defoliation in the past. Therefore, only light to moderate defoliation can be expected in 1986.

Figure 4 illustrates the downward trend in western tent caterpillar populations from a peak in 1980. The data and observations to this point indicate a continuation of this trend.

Figure 1. Area of aspen defoliation in 1986. Overlay shows management emphasis areas.



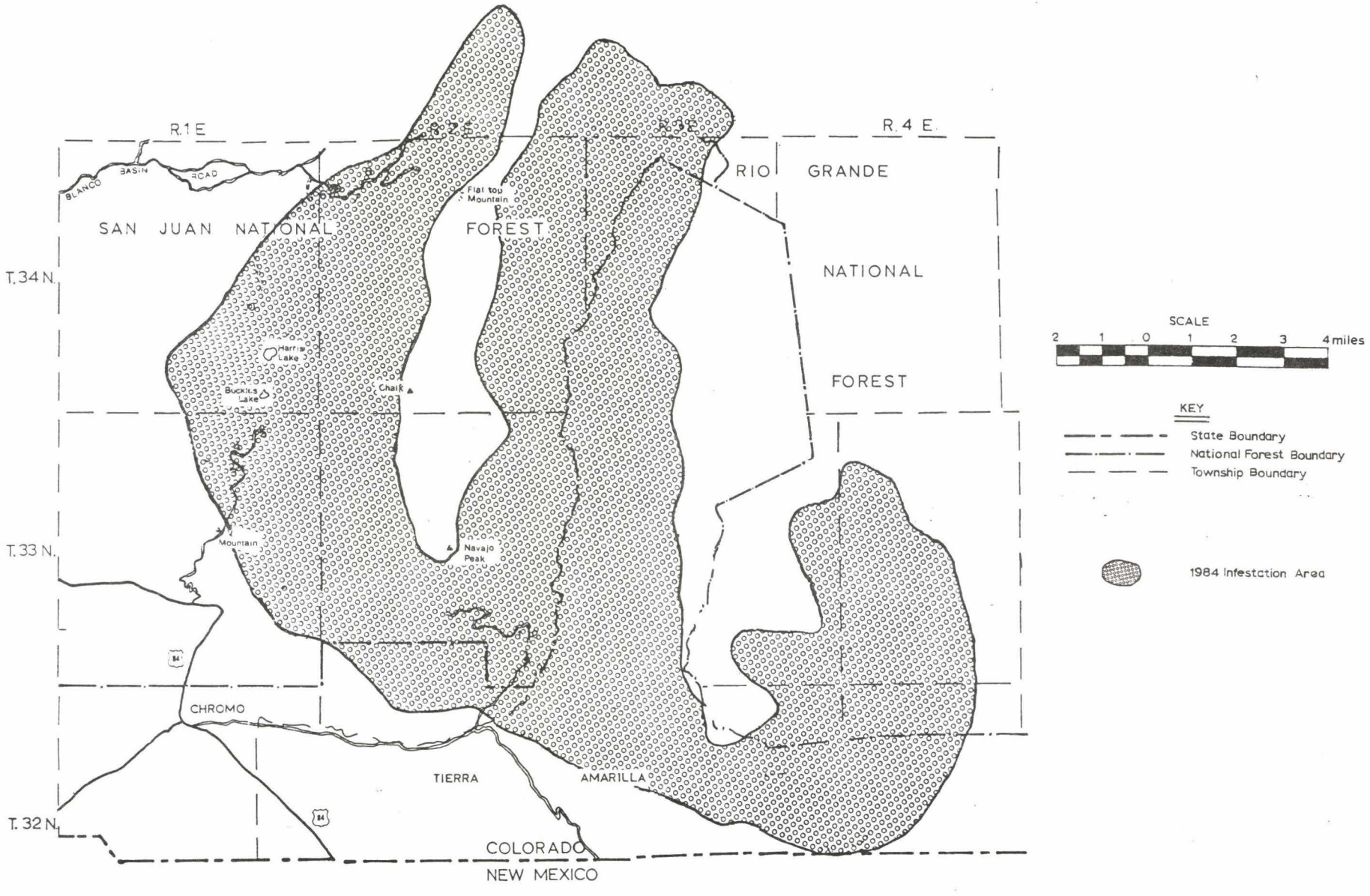


Figure 2. 1984 Western tent caterpillar defoliation on the San Juan and Rio Grande National Forests and adjacent land.

FIGURE 8. ACRES DEFOLIATED BY THE WESTERN TENT CATERPILLAR ON THE SAN JUAN AND RIO GRANDE NATIONAL FORESTS AND ADJACENT LANDS; 1978-1985.

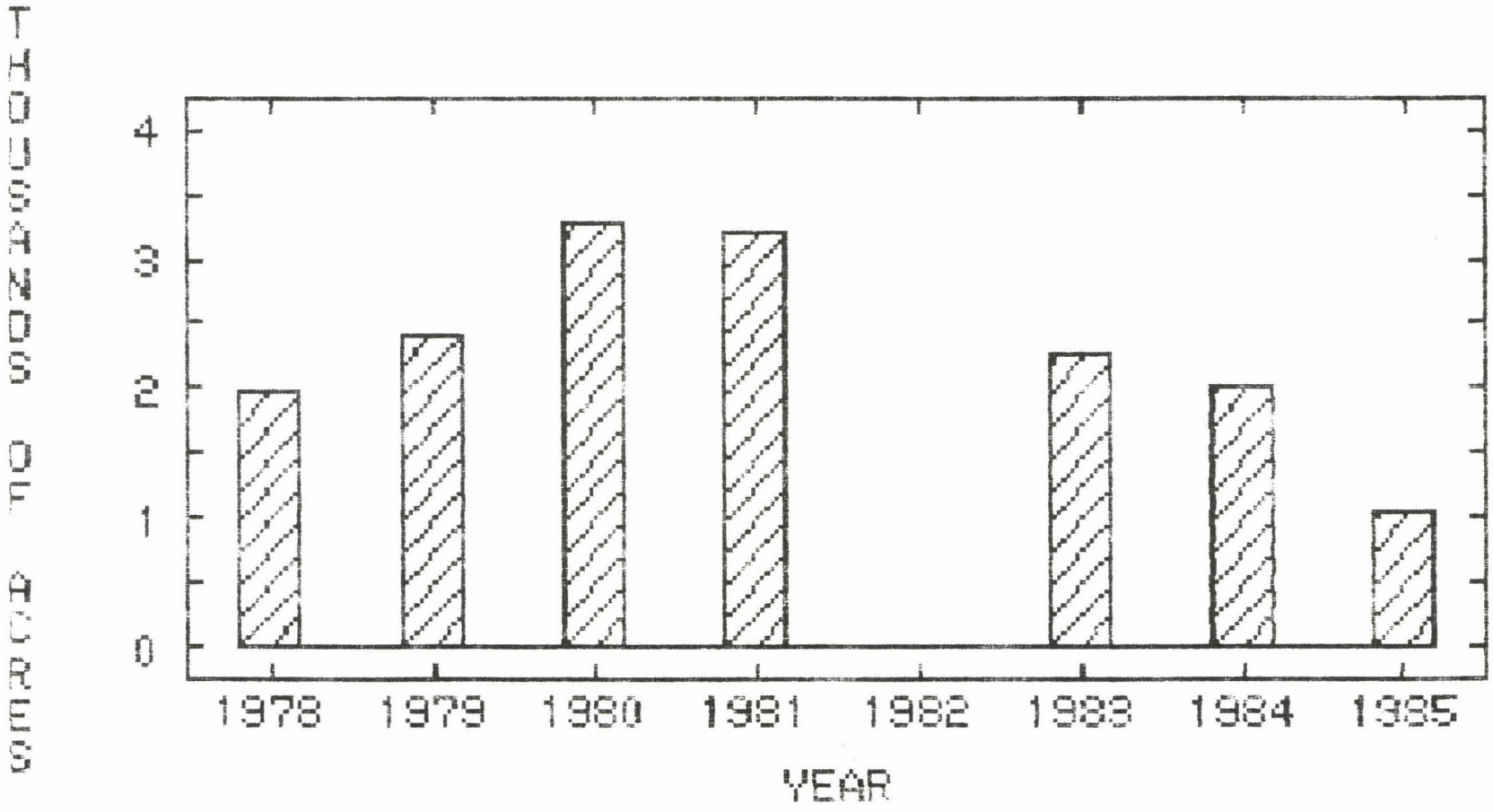


FIGURE 4. WESTERN TENT CATERPILLAR EGG MASS DENSITIES FROM THE TEN ORIGINAL SAMPLING SITES ON THE PAGOSA RANGER DISTRICT, SAN JUAN NATIONAL FOREST; 1978-1985

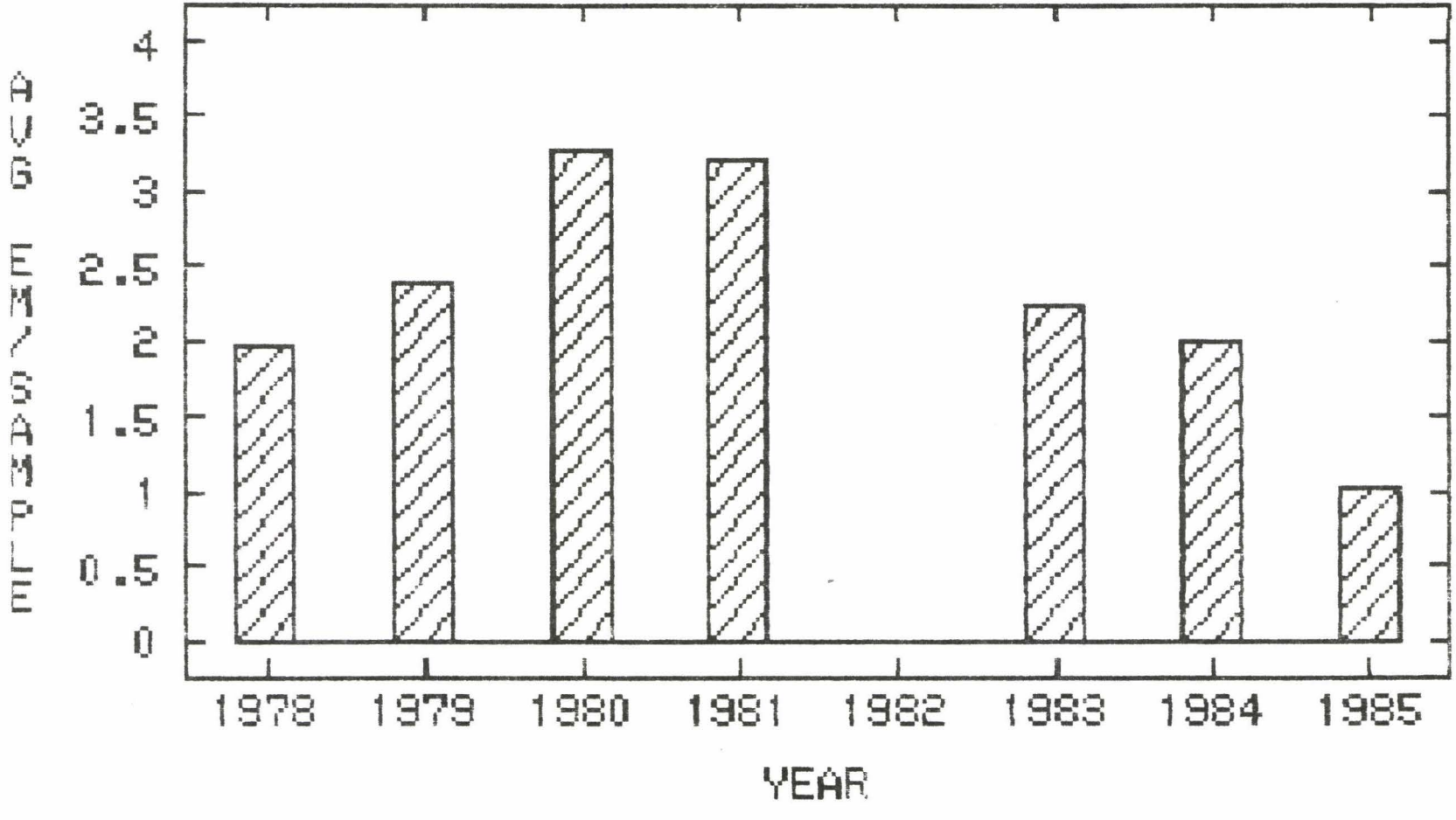


TABLE 1. Acres of visible aspen defoliation caused by the western tent caterpillar in the Blanco Basin, V-Rock and Chama Basin Areas of the San Juan and Rio Grande National Forests, 1984 and 1985. 1/

	1984	1985	Percent Change
Rio Grande N.F.	13,472	410	-97
San Juan N.F.	33,194	20,472	-38
Private	47,245	9,443	-80
Total	93,911	30,325	-68

1/ Acres of defoliation were determined from aerial sketch maps made at the time of peak foliar damage.

Table 2. 1985 Western Tent Caterpillar Survey Data from the San Juan and Rio Grande National Forests; 1984 and 1985

Map Location	Area	Number of Trees	Mean DBH (in.)		Mean Tree Height (ft.)		Mean Crown Height (ft.)		Mean Egg Masses Per Tree		Mean Egg Masses Per 2 Branches	
			1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
(1)	Price Lakes	3	9.2	8.0	49.7	51.0	41.7	25.9	261.7	30.0	1.83	0
(2)	Price Lakes	3	7.6	7.0	35.0	37.9	18.3	23.4	269.3	14.3	.50	.17
(3)	Road 663	3	11.9	10.5	69.0	55.7	23.7	34.5	305.3	167.3	3.83	4.67
(4)	Road 663	3	9.2	11.7	51.7	62.0	17.0	38.4	146.0	118.0	1.67	2.50
(5)	Road 663	3	10.4	11.5	87.0	72.4	20.3	39.4	160.0	130.3	3.50	1.67
(6)	Blanco Basin	3	11.6	9.0	77.3	75.0	26.0	55.9	185.3	10.0	1.00	.17
(7)	Blanco Basin	3	9.6	9.4	54.0	78.8	21.0	59.8	56.7	3.7	.67	0
(8)	Blanco Basin	3	11.7	10.1	74.0	67.6	31.0	41.7	250.3	15.6	.67	.17
(9)	Blanco Basin	3	11.2	9.9	71.3	69.7	21.7	50.8	122.3	7.0	1.33	0
(10)	Mountain Bird Ranch	3	8.4	8.2	56.7	58.8	29.0	38.4	175.0	46.0	5.17	1.00

TABLE 3. Summary of Western Tent Caterpillar Egg Mass Data from 30-inch Branch Samples from the 10 Original Sites on the Pagosa Ranger District, 1977-1985.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	
Trees Sampled	34	37	88	88	84	--	30	30	30	
Egg Masses	192	147	422	622	454	--	135	120	62	
Mean Egg Masses Per Two-Branch Sample	2.84	1.97	2.40	3.28	3.21	--	2.25	2.00	1.03	
Standard Error	0.47	0.47	0.25	0.33	0.39	--	0.53	0.35	0.34	
95% Confidence Limits	+0.96	+0.81	+0.50	+0.65	+0.77	--	+1.04	+0.71	+0.59	a/
Defoliation	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Light to Moderate	b/

a/ The probability that the mean egg mass density lies between 0.44 and 1.62 egg masses per two-branch sample is about 95%.

b/ Light to moderate defoliation is predicted because the 1985 mean egg mass density falls below the range of egg mass densities that have resulted in severe defoliation in the past.

RECOMMENDATIONS

Since the tent caterpillar population is expected to continue to decline, control efforts are not necessary. The recommended approach is to focus on the affected stands rather than the pest population.

The area affected by the western tent caterpillar lies across four management emphasis areas which have been identified in the San Juan National Forest Plan (Figure 1). These areas emphasize:

- Semi-primitive non-motorized recreation.
- Livestock grazing.
- Production and utilization of wood fiber on gentle slopes.
- Increased water yield.

Management activities within each emphasis area should be designed to attain the management objectives for that area.

In those areas where the management objective is to retain the aspen cover type, regeneration clearcuts should be made. Most of the affected stands are greater than 80 years old and in a state of decline which has been accelerated by chronic defoliation and diseases.

In some of the most severely damaged clones where many of the trees have died, natural regeneration through sprouting may not occur after clearcutting. This may not be a problem in the livestock grazing emphasis area or in the area where the emphasis is on increased water yield. However, if the aspen cover type is to be retained in the severely damaged clones, clearcutting will have to be followed by the planting of aspen seedlings. Aspen seedlings are commercially available in Colorado. The success of any aspen planting will be dependent upon how well the seedlings are protected from decimation by livestock and wildlife.

Regenerating the affected aspen stands will not prevent future outbreaks. The only way to prevent future tent caterpillar outbreaks would be to convert the aspen stands to non-host tree species.